D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

To: G. Kendall Taylor, P.G., Director
Division of Hydrogeology
Bureau of Land and Waste Management

Thru: Jack Gelting, P.G., Manager
RCRA Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

From: Cynde Devlin, Hydrogeologist
RCRA Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

Date: August 19, 2004

Re: Koppers Incorporated
SCD 003 353 026
Florence County

Evaluation of the Koppers Inc. Site status under the RCRIS Corrective Action Environmental Indicator Event Code CA725 (Human Exposures)

Please find attached an evaluation of the Environmental Indicator (EI) Event Code CA 725 (Human Exposures) for the Koppers Inc. Site.

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of the Koppers site's status in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRIS):

Current Human Exposures Under Control (CA725)

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the second evaluation for the Koppers site. An evaluation of Human Exposures Controlled (CA 725) and Groundwater Releases Controlled (CA 750) was completed for Koppers in September 1996. The CA 725 evaluation resulted in a "NO" because of surface water and sediment contamination. However, a risk assessment for both on-site and off-site soil and sediment has been completed to evaluate the current status of human exposures. The risk assessment was used to complete this evaluation.

III. FACILITY SUMMARY

Koppers Inc. is a wood preserving/wood treating facility located approximately 1.5 miles east of Florence, South Carolina. Wood treating operations using pressure injection generate waste containing creosote and pentachlorophenol. These wastes are classified as K001 wastes. Releases from solid waste management units (SWMUs) and areas of concern (AOCs) have contributed to groundwater, soil and sediment contamination across the facility. The main contaminants of concern include pentachlorophenol, polyaromatic hydrocarbons, metals, and dioxins.

Wastewater containing K001 flowed through three surface impoundments (regulated units) and out onto an adjacent sprayfield. The surface impoundments were certified closed on March 8, 1991 as landfills under post-closure care. The sprayfield has undergone closure via an Administrative Order 92-61-SW issued November 19, 1992.

February 1988, the Environmental Protection Agency (EPA) issued a 3008(h) Order (US Docket Number 88-03-R) for the Koppers facility requiring stabilization of the groundwater contaminant plume along the southern property boundary. Koppers installed a series of groundwater extraction wells along the southwestern and southern property boundary to prevent further migration of the groundwater contaminant plume. The extraction system continues to operate to date.

The South Carolina Department of Health and Environmental Control issued Post Closure Care Hazardous Waste Permit SCD 003 353 026 in August 1995. A renewal Post Closure Care Hazardous Waste Permit application was submitted to the Department in February 2003 and is under Department review.

IV. CONCLUSION FOR CA725

This evaluation for Event Code 725 finds that human exposures are controlled.

V. SUMMARY OF FOLLOW-UP ACTIONS

The Human Health and Ecological Risk Assessment has identified some areas affected by site operations that will require remedial action based on future potential land use. Those areas will be addressed as the Corrective Measures Study proceeds.

Attachments: CA725: Current Human Exposures Under Control

cc: Marion Rembert, Pee Dee District EQC
John Johnston, EPA Region 4
Tim Basilone, Koppers
Mike Bollinger, Beazer
Syed Ahmed, EPA Region 4

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: **Koppers**
Facility Address: **280 Koppers Rd., Florence, South Carolina 29501**
Facility EPA ID #: **SCD 003 353 026**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

__X__ If yes - check here and continue with #2 below.

_____ If no - re-evaluate existing data, or

_____ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	Rationale / Key Contaminants
Groundwater	_X_	___	____see below_____
Air (indoors)[2]	___	_X_	_____
Surface Soil (e.g., <2 ft)	_X_	___	____see below_____
Surface Water	_X_	___	____see below_____
Sediment	_X_	___	____see below_____
Subsurf. Soil (e.g., >2 ft)	_X_	___	____see below_____
Air (outdoors)	___	_X_	_____

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__X__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):_
As a result of wood treating operations at the site, groundwater is contaminated above maximum concentration levels (MCLs) and preliminary remedial goals (PRGs), where no MCL is available. Dense non-aqueous phase liquid (DNAPL) is found in several wells. For example, recovery well TRW-5R, located in the former lagoon area, contains a measured DNAPL thickness of 12 ft and well B83-14A, located in the process area, contains a measured DNAPL thickness of 13.3 ft.

Dissolved phase groundwater contamination is found in groundwater monitoring wells across the site. Contaminants detected in groundwater include polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol, and metals. Three aquifer zones above a confining unit characterize the uppermost aquifer at the Koppers facility. Groundwater contamination has been reported for all three aquifer zones (A, B, and C zones). Routine groundwater sampling has historically been reported only for the area immediately surrounding the former surface impoundments (RCRA regulated units), as required by the Post Closure Permit. However, a site wide groundwater sampling event was initiated in September 2002 to collect data for the Environmental Indicator and the Corrective Measures Study. The following represent exceedences of MCLs or PRGs in groundwater reported from September 2002 and June 2004 sampling events. Monitoring well B82-10A, the only A zone aquifer well sampled during the referenced events, exceeded MCLs or PRGs for pentachlorophenol (25 ug/l), naphthalene (240 ug/l), benzo(b)fluoranthene (23 ug/l), and arsenic (9.7 ug/l). This well is located along the southern property boundary. B zone monitoring well B84-01B exceeded MCLs or PRGs for pentachlorophenol (1400 ug/l) and benzene (75 ug/l). B84-01B is located in the southwest portion of the site near the former lagoon area. C-zone monitoring well B95-

05C was last sampled in March 2004 with a detection of 11 ug/l for pentachlorophenol. This well is located downgradient of the former surface impoundments.

A residential well sampling program is conducted for the neighborhood south of the facility. The most recent sampling event (June 2004) reported no detections in six residential wells sampled.

Subsurface and surface soil is contaminated across the site with PAHs, pentacholorphenol, metals, and dioxins. Concentrations exceed residential and industrial risk levels. For example, at soil boring location APA-B106 the concentration of pentachlorophenol ranges from 50,000 ug/kg at a depth of 3-5 feet below land surface to 34,000 ug/kg at a depth of 5-6 feet below land surface. The EPA Region IX residential PRG is 3000 ug/kg and the industrial PRG is 9000 ug/kg. Other contaminants detected at this soil sample location (3-5 foot range) which exceed both the residential and industrial PRG include naphthalene (2,000,000 ug/kg), indeno(1,2,3-cd)pyrene (1700 ug/kg), dibenzo(a,h)anthracene (11,000 ug/kg), benzo(k)fluoranthene (65,000 ug/kg), benzo(b)fluoranthene (79,000 ug/kg), benzo(a)pyrene (60,000 ug/kg), and benzo(a)anthracene (180,000 ug/kg). The data referenced was collected in November 2003.

Off-site soil is contaminated above residential and industrial PRGs. For example, the concentration of pentachlorophenol detected at Outfall 001 (location SDS-101) is reported as 22,000 ug/kg, which exceeds the industrial PRG of 9000 ug/kg. Arsenic was reported at a concentration of 14 mg/kg, which exceeds the Region IX industrial PRG of 1.6 mg/kg. The maximum detected concentration of 2,3,7,8 TCDD dioxin downgradient of Outfall 001 is 4.03×10^{-2} ug/kg, which exceeds the residential PRG of 3.9×10^{-3} ug/kg and the industrial PRG of 1.6×10^{-2} ug/kg.

Sediment is contaminated with arsenic and PAHs. For example, benzo(a)anthracene was detected in off-site sediment (SDS-105) at a concentration of 32000 ug/kg, which exceeds the residential PRG of 620 ug/kg and the industrial PRG of 2.1 ug/kg. Contaminants also exceed standards at this location for benzo(a)pyrene (15,000 ug/kg), benzo(b)fluoranthene (14,000 ug/kg), benzo(k)fluoranthene (6300 ug/kg), dibenzo(a,h)anthracene (1900 ug/kg), indeno(1,2,3-cd)pyrene (3400 ug/kg), naphthalene (60,000 ug/kg), and arsenic (3.5 mg/kg).

Pye Branch and Two Mile Creek are located adjacent to the site. Surface water samples were collected in October 2003 for the Environmental Indicator and Risk Assessment. Contamination was reported above MCLs and Water Classification & Standards for Surface Water (R.61-68) in Pye Branch and Two Mile Creek. For example, pentachlorophenol (location SWS-101) was reported at a concentration of 260 ug/l, which exceeds the MCL of 1 ug/l and the surface water standard of 0.28 ug/l. Arsenic was detected at the same location at a concentration of 11 ug/l. Benzo(a)anthracene was detected at a concentration of 0.11 ug/l in Two Mile Creek (locations SWS-103 and SWS-105), which exceeds the surface water standard (0.0044 ug/l) and the PRG (0.092 ug/l).

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be

reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	no	no	no	no	no	no	no
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft)	no	yes	no	yes	yes	no	no
Surface Water	no	no	no	no	yes	no	no
Sediment	no	no	no	no	yes	no	no
Soil (subsurface e.g., >2 ft)	no	no	no	no	yes	no	no
~~Air (outdoors)~~	___	___	___	___	___		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

___ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

_X_ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

___ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s): Soil data collected across the site indicates that concentrations of site related contaminants exceed residential and industrial risk based standards.

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[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable

"levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

__**X**__ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s) :
Beazer Inc. conducted a Human Health and Ecological Risk Assessment (dated June 1, 2004 – revised July 19, 2004), which evaluated current exposures along with future potential risk and ecological risk. The risk assessment was based on historical data and recent data that were collected specifically for the Risk Assessment and the on-going Corrective Measures Study. Groundwater, surface water, soil and sediment were evaluated for the Risk Assessment. The Human Health Risk Assessment concluded that non-cancer and cancer health effects are not expected to exceed acceptable EPA risk ranges for current receptors. Thus current exposures cannot be reasonably expected to be significant. Additionally, groundwater contamination is currently addressed by the pump and treat system that is located along the southern property boundary.

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

_X_ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Koppers Inc. facility, EPA ID # 003 353 026, located at 280 Koppers Road, Florence, South Carolina under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by: Cynde L Devlin Date: 8-19-04
Cynde L. Devlin
Hydrogeologist

Supervisor Date: 8/20/04
Jack Gelting, P.G., Manager
RCRA Hazardous Waste Section
South Carolina Department of Health and Environmental Control

Locations where References may be found:

1. Data Submittal Report – Implementation of Corrective Measures Study Workplan, dated March 15, 2004

2. Human Health and Ecological Risk Assessment, dated June 1, 2004 (revised July 19, 2004, revised August 9, 2004)

3. Results of Comprehensive Groundwater Sampling Event, dated September 8, 2003

4. 2003 Annual Post Closure Groundwater Monitoring Report, dated February 27, 2004

5. Facility Wide Groundwater Monitoring, dated July 30, 2004

6. Semi-Annual Groundwater Monitoring Report, dated September 5, 2003

Contact telephone and e-mail numbers:

Cynde Devlin
803-896-4020
devlincl@dhec.sc.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.